

RESEARCH, DEVELOPMENT & TECHNOLOGY TRANSFER QUARTERLY PROGRESS REPORT

Wisconsin Department of Transportation
DT1241 8/2010

INSTRUCTIONS:

Research project investigators and/or project managers should complete a quarterly progress report (QPR) for each calendar quarter during which the projects are active.

WisDOT research program category: <input type="checkbox"/> Policy research <input checked="" type="checkbox"/> Wisconsin Highway Research Program <input type="checkbox"/> Other <input type="checkbox"/> Pooled fund TPF#	Report period year: 2011 <input type="checkbox"/> Quarter 1 (Jan 1 – Mar 31) <input checked="" type="checkbox"/> Quarter 2 (Apr 1 – Jun 30) <input type="checkbox"/> Quarter 3 (Jul 1 – Sep 30) <input type="checkbox"/> Quarter 4 (Oct 1 – Dec 31)	
Project title: Laboratory Study of Concrete Properties to Support Implementation of the New AASHTO Mechanistic-Empirical Pavement Design Guide		
Project investigator: Steve Cramer	Phone: 608-265-2001	E-mail: cramer@engr.wisc.edu
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WisDOT contact: Barry Paye/James Parry	Phone:	E-mail:
WisDOT project ID: 0092-11-05	Other project ID:	Project start date: 10/21/2010
Original end date: 10/20/2011	Current end date: 10/20/2011	Number of extensions: 0

Project schedule status:

On schedule On revised schedule Ahead of schedule Behind schedule

Project budget status:

Total Project Budget	Expenditures Current Quarter	Total Expenditures	% Funds Expended	% Work Completed
\$102,000.00	\$13,709.00	\$32,632.00	32%	48%

Project description:

The strength and durability of concrete paving materials are largely dependent on the curing conditions under which the structure is maintained at an early age. Large scale concrete paving operations present unique challenges that prevent the implementation of curing strategies other than the application of membrane forming curing compounds (MFCCs). The method of action of curing compounds is unknown other than that they prevent evaporation via the formation of a hydrophobic membrane. Curing compounds have a variety of formulations and chemistries that affect the nature of this membrane, its effectiveness at preventing evaporation, and interaction with the curing concrete surface. This situation is further complicated when supplemental cementitious materials (SCMs including slag, fly ash, etc.) are included in the concrete design.

The objectives of this research are to:

1. Evaluate the scaling resistance of concrete materials prepared with several different MFCCs and SCMs.
2. Evaluate the chloride ion penetration resistance of the above materials
3. Evaluate the effectiveness of several MFCCs at preventing evaporation of water from concrete surfaces.
4. Attempt to determine the microstructural consequences of curing concrete pavements with MFCCs.

Progress this quarter (includes meetings, work plan status, contract status, significant progress, etc.):

In this quarter the team focused on: sample conditioning, scaling resistance testing, and methods preparation.

1. Concrete specimens treated with polyalphamethylstyrene (PAMS), linseed oil emulsion, clear acrylic, clear chlorinated rubber, and wet room curing have nearly completed testing. Freeze-thaw cycling in deicer solutions has been completed. Long term ponding for some specimens is completed, and concrete samples have been collected for analysis.
2. Specimens with wax emulsion curing compound have been prepared and are undergoing freeze-thaw cycling and ponding.
3. Preparations for testing the water retention of the various curing compounds using ASTM C156 are nearly completed
4. The required solutions and equipment needed for electrochemical analysis of acid soluble chloride ion in concrete samples has been received in anticipation of beginning ASTM C156 testing

The research team meets on project management and progress every two weeks.

Anticipated work next quarter:

Work next quarter will be focused on final testing of samples and controls for ASTM C1543 and AASHTO T259, as well as chemical analysis of AASHTO T259 samples that have completed long term ponding. The resistance of each MFCC to water penetration will be tested via ASTM C156. Ongoing data analysis and report preparation will continue during this quarter.

1. Refine schedule and request no cost extension
2. Concrete specimens subjected to freeze/thaw cycling and chloride ponding for AASHTO T259 and ASTM C1543 testing
3. AASHTO T259 specimens that have reached the required age will be analyzed for chloride concentration using electrochemical techniques outlined in ASTM C114-10
4. ASTM C156 testing will be performed for comparison of the MFCC types
5. Data analysis of C1543 and T259 experiments will be completed
6. A representative sample of the C1543 and T259 specimens for each combination of coarse aggregate, MFCC, and SCM will be chosen and prepared for electron microscopy and potentially petrographic analysis
7. Report document preparation will continue

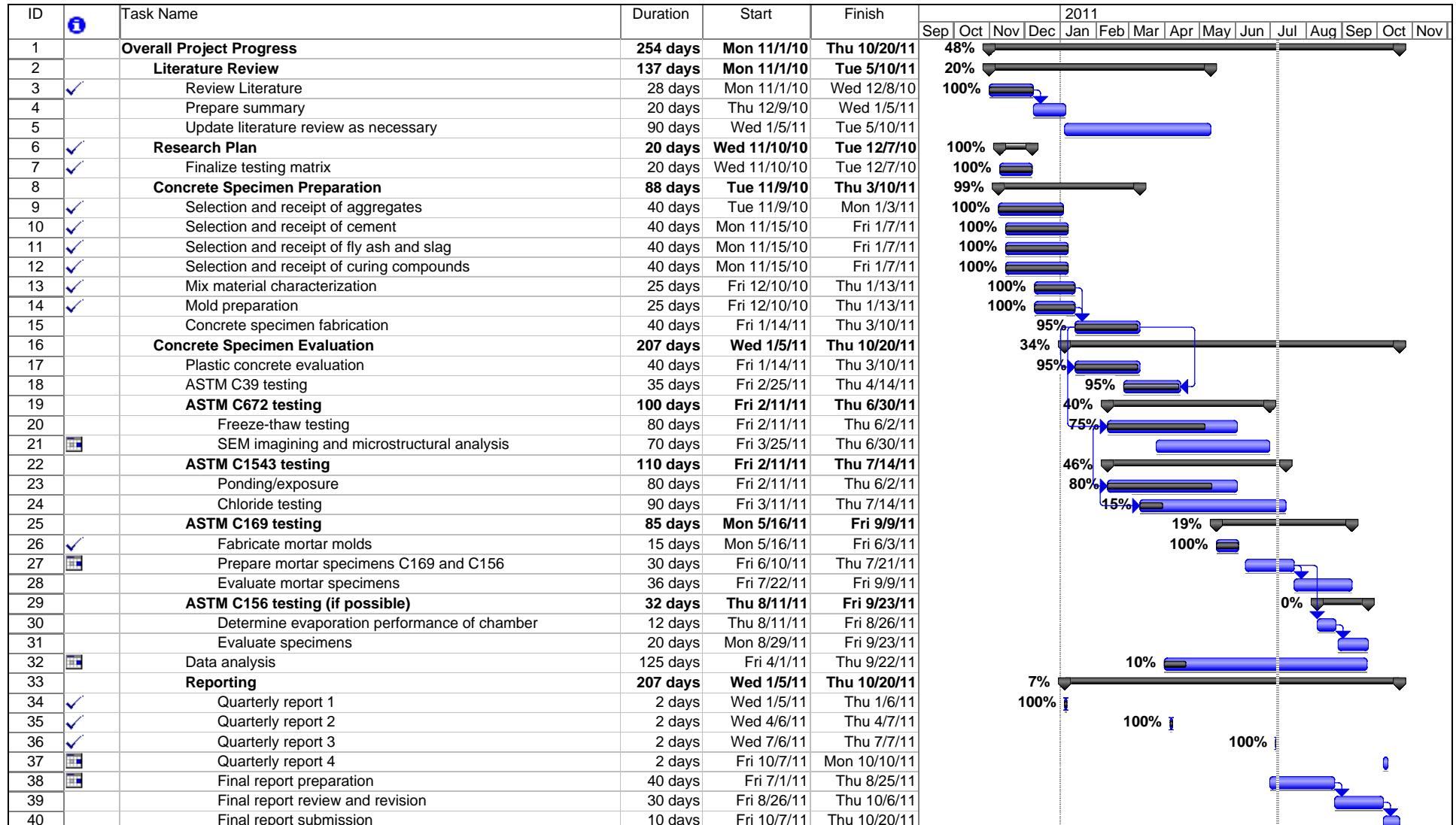
Circumstances affecting project or budget:

The project is slightly behind schedule as the 12 month time frame for a laboratory project of this type is very tight and difficult to achieve. A no-cost extension will be requested this quarter.

Insert Gantt chart and other project documentation – attach additional pages if necessary

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Staff receiving QPR:	Date received:
Staff approving QPR:	Date approved:



Project: Curing Compounds 070711
Date: Thu 7/7/11

Task  Milestone  External Tasks 
 Split  Summary  External Milestone 
 Progress  Project Summary  Deadline 